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ABSTRACT

A longitudinal study was conducted which focused on the concerns of elementary school teachers who were involved in implementing the Science Curriculum Improvement Study (SCIS) curriculum. Two major questions were addressed: (1) Do stages of concern exist? (2) If so, are they developmental? The sample consisted of teachers attending summer workshops in 1974 (N=15) and 1975 (N=38). Concerns were assessed five times (including before and after the training workshops) using the Stages of Concern Questionnaire (SoCQ), a Likert-type instrument developed to measure seven hypothesized stages of concern. The SoCQ consists of 35 statements (five items for each stage) which allow respondents to describe a concern they feel at a given point in time. The seven hypothesized stages are awareness; informational; personal; management; consequence; collaboration; and refocusing. Results indicate that individuals in this sample followed a general developmental trend from being more intense at the lower stages of concern to becoming more intense at the higher stages of concern and that management concerns never predominated any group. Other findings (such as comparisons between teachers attending the two different workshops) are reported and discussed. (JN)

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CONCERNS EXPRESSED BY ELEMENTARY SCHOOL TEACHERS ABOUT THE IMPLEMENTATION OF THE SCIS CURRICULUM

Susan F. Loucks

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CONCERNS EXPRESSED BY ELEMENTARY SCHOOL TEACHERS ABOUT THE IMPLEMENTATION OF THE SCIS CURRICULUM

Susan F. Loucks

Procedures for Adopting Educational Innovations Project
Research and Development Center for Teacher Education
The University of Texas at Austin

Spring 1977

Paper presented at the annual meeting of the
Association for the Education of Teachers of Science
Cincinnati, Ohio, March 25, 1977

CONCERNS EXPRESSED BY ELEMENTARY SCHOOL TEACHERS ABOUT THE IMPLEMENTATION OF THE SCIS CURRICULUM[1,2]

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Science education has been in the forefront of the countless curriculum development and implementation efforts of the past fifteen years. At the same time, science educators have been ahead in the development of training and in-service materials and activities to provide teachers with the knowledge and skills necessary to implement the new science curricula. Although advanced in the technology of inservice and training, science educators, as others, continue to ask some very important questions about implementing curricula: "What can I provide teachers to best meet their current needs?", "What are those current needs, how can I identify them?", "Can I somehow make my workshops relevant to what teachers' concerns are at this point in time?"

One concept that science and other educators are finding useful in understanding how teachers feel as they are involved in change and what help they

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[1]Paper presented at the annual meeting of the Association for the Education of Teachers of Science, Cincinnati, Ohio, March 25, 1977.

[2]The research described herein was conducted under contract with the National Institute of Education. The opinions expressed are those of the author and do not necessarily reflect the position or policy of the National Institute of Education, and no endorsement by the National Institute of Education should be inferred.

might find most relevant, is the concept of concerns. Generalized from work by Frances Fuller (1969) in the area of pre- and inservice teacher education, extensive research in the area of concerns has been underway at the Texas Research and Development Center for Teacher Education. This research seeks to understand what concerns individuals have as they adopt innovations, how these concerns develop and change, and how knowledge of concerns can be used by the "adoption agent" (consultant, facilitator, principal, dean) to provide the most relevant input, support, and assistance to individuals to make implementation successful.

This paper deals with a one-year longitudinal study of the concerns of elementary school teachers involved in implementing the SCIS (Science Curriculum Improvement Study) curriculum. Concerns were assessed five times during the study, including before and after a two-week summer training workshop. From this study, it is possible to describe the dynamics of a curriculum implementation from the point of view of the individuals most directly involved -- the teachers -- and to draw some implications about how time and events combine to change individuals' concerns about the curriculum.

Stages of Concern About the Innovation

In her research with pre- and inservice teachers, Fuller (1969) found that individual concerns about teaching appear to change in a predictable way. Initial concerns focus on self (Is teaching really for me? Will my supervising teacher think I'm good? Will I be able to stand six hours a day with thirty kids in one room?). With the resolution of self concerns, task-oriented concerns appear (How can I best organize my classroom and schedule my time? Are these materials all I need to teach this unit?). Finally, when and only when the teacher feels comfortable with the tasks of teaching, the primary focus of

concern becomes the impact the teacher is having on learners (Are they learning what I'm teaching? Are they learning what they need to know?).

Members of the R&D staff, having spent many years facilitating the adoption of innovations in both school and university settings, recognized that individuals involved in change -- not just students preparing to teach -- exhibit concerns about the innovation that are not unlike those experienced by student teachers. It also appeared that knowing what individuals' concerns were at any given time would help a facilitator "tailor" assistance to help resolve those concerns. Further study resulted in the description of seven Stages of Concern about an innovation, ranging in general through Fuller's Self, Task, and Impact orientations. These Stages of Concern (SoC) are defined in Figure 1.

Stages of Concern were conceptualized as a part of the Concerns-Based Adoption Model (CBAM) *Hall, Wallace, & Dossett, 1973), a model of the process of innovation adoption that focuses primarily on the individual -- the "user" within the larger "user system" (school, college, etc.). Initial verification of the CBAM, and within it, Stages of Concern, involved two and a half years of intensive measurement development efforts and large-scale, nationwide, cross-sectional and longitudinal studies of individuals involved in change in both school and university settings. Two of the studies -- one involving elementary school teachers focusing on the innovation of team teaching, and the other involving university faculty members focusing on the innovation of instructional modules -- provided longitudinal data about the Stages of Concern of individuals over two school years yielding valuable information about general trends in concerns. This data was collected twice each year (Fall 1974, Spring 1975, Fall 1975, Spring 1976). An additional study was conceived to follow a smaller sample more closely, collecting information several more times during

Figure 1

STAGES OF CONCERN ABOUT THE INNOVATION*

0 *AWARENESS:* Little concern about or involvement with the innovation is indicated.

1 *INFORMATIONAL:* A general awareness of the innovation and interest in learning more detail about it is indicated. The person seems to be unworried about himself/herself in relation to the innovation. She/he is interested in substantive aspects of the innovation in a selfless manner such as general characteristics, effects, and requirements for use.

2 *PERSONAL:* Individual is uncertain about the demands of the innovation, his/her inadequacy to meet those demands, and his/her role with the innovation. This includes analysis of his/her role in relation to the reward structure of the organization, decision making and consideration of potential conflicts with existing structures or personal commitment. Financial or status implications of the program for self and colleagues may also be reflected.

3 *MANAGEMENT:* Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, scheduling, and time demands are utmost.

4 *CONSEQUENCE:* Attention focuses on impact of the innovation on students in his/her immediate sphere of influence. The focus is on relevance of the innovation for students, evaluation of student outcomes, including performance and competencies, and changes needed to increase student outcomes.

5 *COLLABORATION:* The focus is on coordination and cooperation with others regarding use of the innovation.

6 *REFOCUSING:* The focus is on exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. Individual has definite ideas about alternatives to the proposed or existing form of the innovation.

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*Original concept from Hall, G. E., Wallace, R. C., Jr., & Dossett, W. A. A developmental conceptualization of the adoption process within educational institutions. Austin: Research and Development Center for Teacher Education, The University of Texas, 1973.

a school year in an effort to gain more insight into Stages of Concern. The study of the SCIS implementation yielded such information providing an in-depth look at the concerns of individuals who had varying amounts of experience with this science curriculum.

Methodology

The Sample. There were initially two groups involved in the study: one group attended a two-week SCIS workshop at the University of Kansas during the summer of 1975, and another group had attended the same workshop the previous summer, 1974. There were thirty-eight individuals in the 1975 summer workshop group, and fifteen individuals in the 1974 workshop group. All of these individuals were Kansas elementary school teachers with the exception of two principals and one junior high school teacher who had attended the workshop for information purposes. (NOTE: These three individuals were later removed from the data base because their data would not reflect concerns about actually using the curriculum.)

The Stages of Concern Questionnaire. The Stages of Concern Questionnaire (SoCQ) was developed to measure the seven hypothesized Stages of Concern (Hall, George, & Rutherford, 1977). The SoCQ is a Likert-type instrument which allows respondents to react to thirty-five statements of concern by indicating how closely each statement describes a concern they feel at that point in time. There are five statements, or items, for each Stage of Concern.

The SoCQ was developed through a procedure of item writing, Q-sorting by a panel of judges, completion of a 195-item prototype measure by 366 individuals, and factor analysis. Seven factors corresponding to the seven Stages of Concern resulted from a VARIMAX rotation. The items selected for the final instrument were among those which loaded highest on each factor.

Test-retest reliability correlations of the SoC Questionnaire ranged from .65 to .86 on the seven Stages of Concern scores. The internal consistency (alpha coefficients) of the scores ranged from .80 to .93. The alpha coefficient for the total score was .96. Validity studies involving intercorrelation matrices, judgments of concerns based on interview data, and confirmation of expected group differences and changes over time, have indicated that the SoC Questionnaire measures Stages of Concern as they have been defined (George, 1977).

The SoC Questionnaire data are scored using a percentile table. An SoC profile is developed that illustrates the intensity of concern expressed by the individual on each Stage of Concern. A Group profile can also be developed that describes the average intensity of concerns of individuals within the group for each Stage of Concern.

Data Collection. Stages of Concern data were collected from all participants in May 1975 (prior to the summer workshop). Participants in the 1975 summer workshop also completed a questionnaire at the beginning of the workshop (July). All participants were then asked to complete questionnaires in September 1975, and January and April 1976. The numbers of questionnaires completed and returned at each data collection period are given in Table 1.

Table 1

Numbers of SoC Questionnaires Completed for Each Data Collection Period

	1975			1976	
	May	July*	September	January	April
Number of Participants	53	34	45	40	44

*Only 1975 workshop participants

Although the number of participants responding to the five questionnaires varied, there were thirty individuals who consistently provided data every data collection period, twenty from the 1975 workshop group, and ten from the group that had attended the 1974 workshop.

Research Questions. As mentioned before, the SCIS study was part of a series of studies aimed at initially verifying the concept of Stages of Concern About the Innovation. Two major research questions were: (1) Do Stages of Concern exist? and if so, (2) Are they developmental? Before the SCIS study was initiated, data from the cross-sectional studies had shown that Stages of Concern existed, since individuals had been found to exhibit concern about each of the stages at any point in time, with one or two stages generally predominating (Hall, 1976). However, the developmentalness of Stages of Concern was still a question, and the SCIS study, with its intense focus on individuals' concerns throughout a year's time, was designed to probe this question. Therefore, a major research question involved in the SCIS study was, "Are Stages of Concern developmental?"

Several secondary questions were also posed that involved the particular conditions surrounding the sample chosen for the SCIS study. Some of these questions are:

(1) Is there an initial difference in SoC between 1975 workshop participants and 1974 workshop participants?

(2) Is there a difference in SoC before and after the workshop for participants in the 1975 workshop?

(3) Is there a difference in SoC of users of SCIS and nonusers of SCIS both before the 1975 workshop and after?

(4) What can be learned about individuals from the changes in their SoC profiles?

All of these questions can be responded to in terms of both group and individual data.

Findings

Are Stages of Concern Developmental? Stage of Concern data can be analyzed several ways in response to this question. First, it must be noted that if Stages of Concern are developmental, the focus of concern must change over time from being relatively high on Stages of Concern 0, 1, and 2, to being relatively high on Stages of Concern 4, 5, and 6. Figure 2 illustrates the hypothesized "wave motion" that should exist in an SoC profile over time (Hall, 1976). The solid line would indicate a nonuser's profile, with more intensive concerns at Stages 0, 1, and 2, and least intensive concerns at Stages 4, 5, and 6. As use of an innovation begins, Stage 3 Management concerns would become most intense, illustrated by the dashed line in Figure 2, decreasing in intensity on Stages 0, 1, and 2. With experience and increased skill in use, it is hypothesized that Stages 4, 5, and 6 concerns would become more intense, illustrated by the dotted and crossed lines in Figure 2.

One way to respond to the question of developmentalness using data from the SCIS study is to ask whether the concerns of the study's sample changed over time. Figure 3 illustrates group SoC profiles for the thirty individuals who provided all SoC Questionnaires (that is, for 1975 workshop participants who completed the questionnaire five times, and for 1974 workshop participants who completed it four times). These profiles show very little change over time. There is some tendency for Stages of Concern 0 to 2 to decrease in intensity from the May (before workshop) questionnaire to the September (after workshop) questionnaire, with some small increases in the intensity of higher stages. This same shift of intensity occurs also from January to April. The change in concerns profiles, however, is not dramatic.

Figure 2

Ideal Evolution of the Intensity of the Stages of Concern About the Innovation

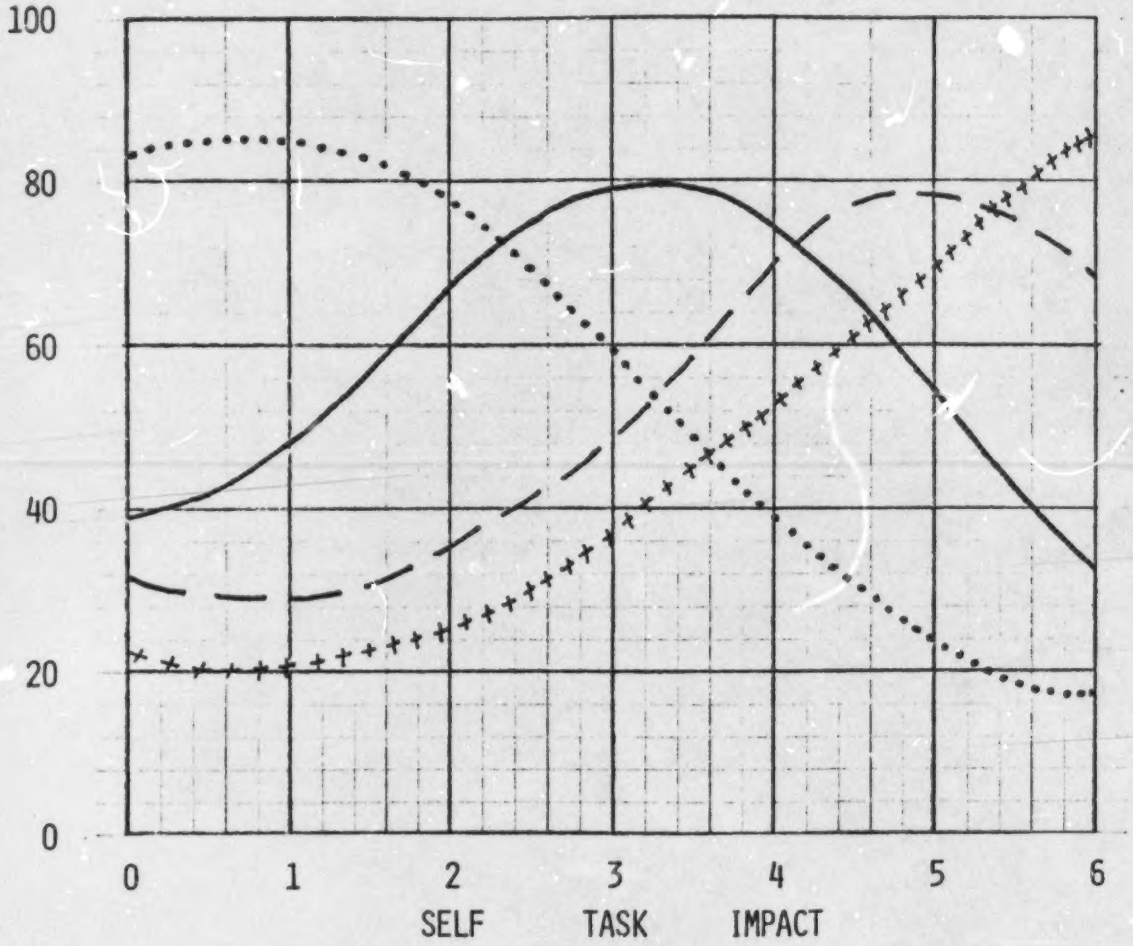
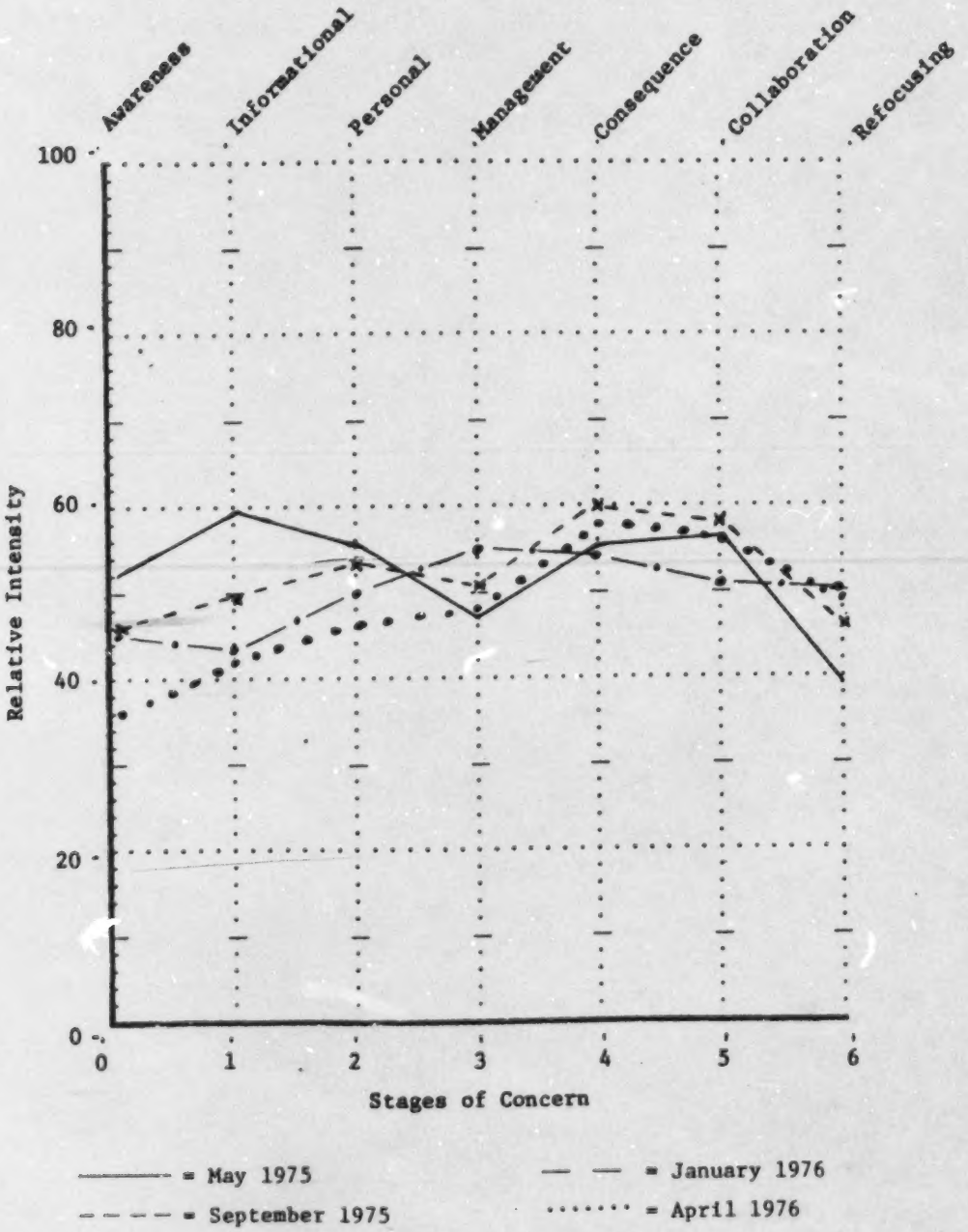


Figure 3

SoC Profiles of Teachers Who Completed Questionnaires
At Four Data Collection Periods (N = 30)



The major problem in interpreting this data usefully is that, since individuals are hypothesized to differ in their concerns depending on whether they are using or not using the innovation, a group profile combining users and nonusers tends to obscure meaningful differences. It is therefore more useful to separate users from nonusers before studying changes in concerns. Figure 4 illustrates the concerns of the ten teachers who were initially nonusers of SCIS when they attended the workshop in 1975. The May data, the light solid line, confirms the hypothesized nonuser pattern of high intensity of lower concerns stages (Stages 1 and 2) and lower intensities at the higher stages (3 through 6). July data (collected at the beginning of the workshop) indicates a rise in management (SoC 3) concerns and above, with a slight lowering in intensity of Stages 0, 1, and 2. The September curve illustrates a further decrease in Stages 0, 1, and 2 and an increase in Stage 4 through 6 concerns, indicating that use of the innovation had begun. January and April data follow this general pattern.

Figure 5 illustrates the concerns of the twenty users of SCIS who returned all of their questionnaires. These include ten individuals who attended the 1975 workshop and ten others who had attended the 1974 workshop. Because the latter ten were not given a July questionnaire, only the other four data collection periods are illustrated on this figure.

The "flatness" of Figure 5 suggests that these users contributed the "flatness" to Figure 3. There is very little change evident in SCIS user concerns over time. This could be attributed to the fact that their concerns indeed did not change appreciably, but it could also be that aggregating this particular set of individuals caused their differences to "cancel each other out." Different treatments of these data under the secondary questions discussed below makes the data more meaningful.

Figure 4

SoC Profiles of SCIS Nonusers
(As Designated in July 1975) for Five Data Collection Periods (N = 10)

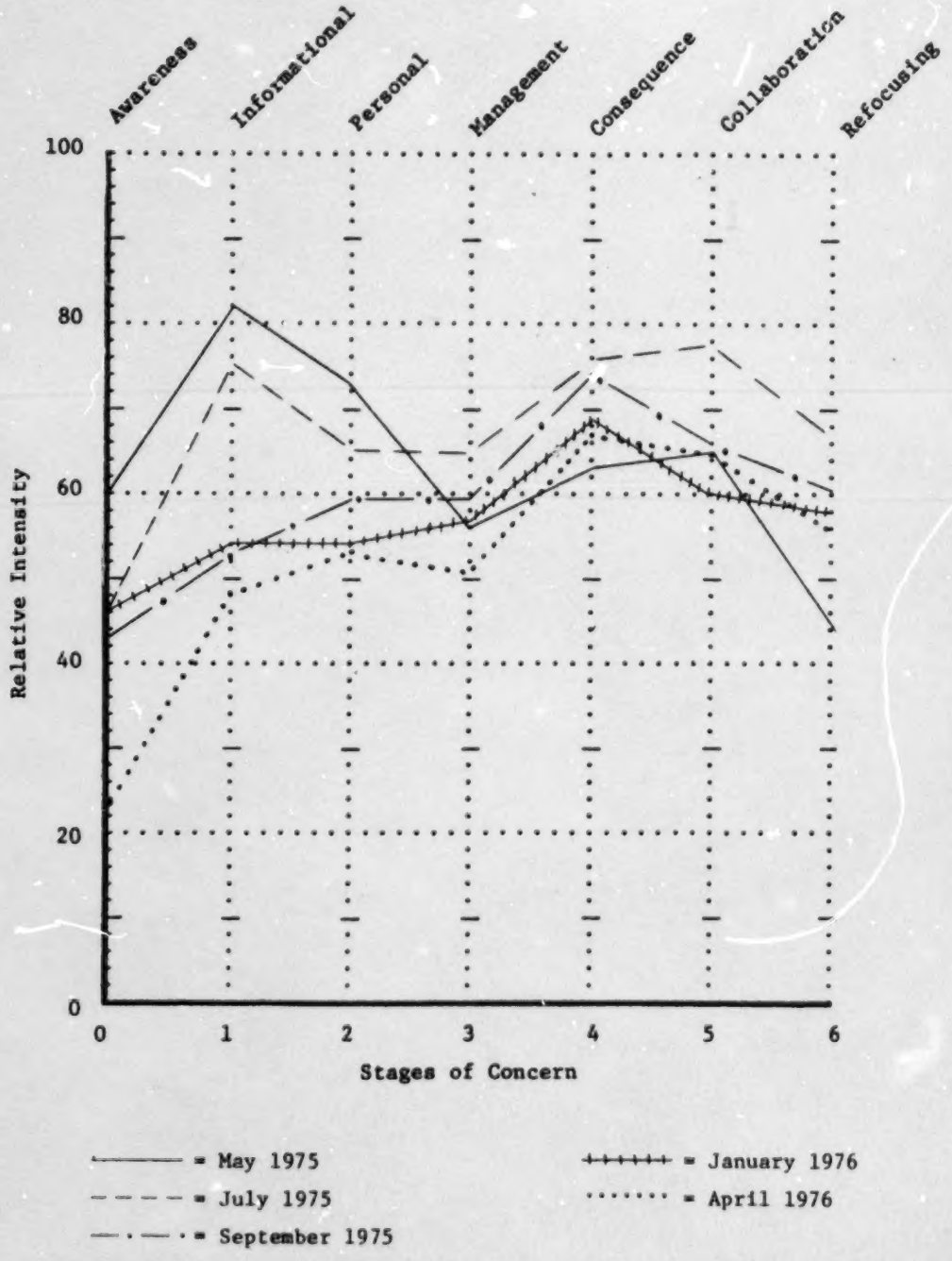
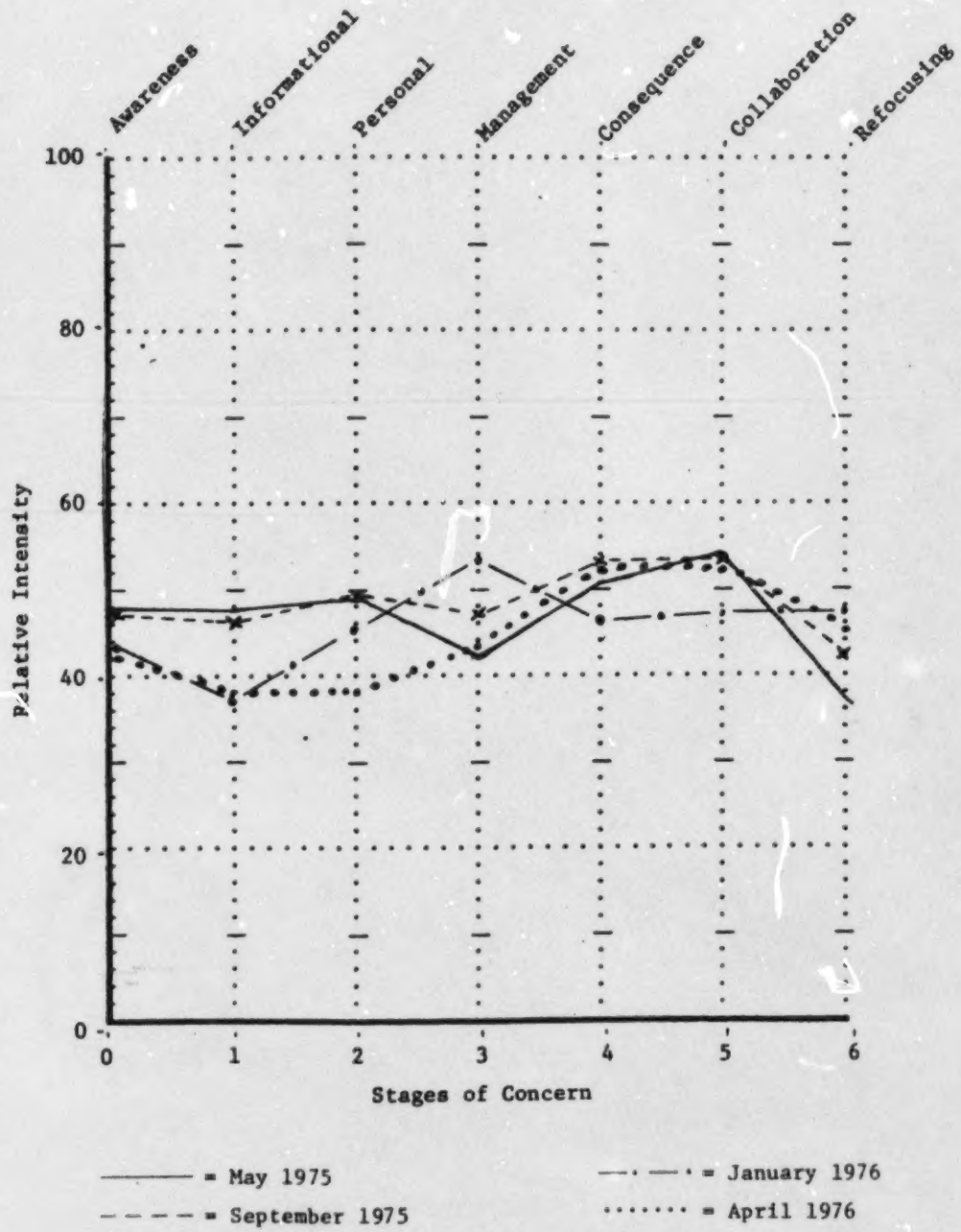


Figure 5

SoC Profiles of SCIS Users
(As Designated in July 1975) for Four Data Collection Periods (N = 20)



Secondary Questions. Responses to the major research question discussed above suggest that individuals implementing an innovation, that is, progressing from nonuse to use, change in their concerns in more or less the predicted way. However, more can be learned about these changes that would have applicability to facilitators of change, and this is reflected in responses to the secondary questions. These questions focus primarily on the effects of a workshop on concerns and so have direct implications for teacher inservice.

(1) Is there an initial difference in SoC between 1975 workshop participants and 1974 workshop participants?

This question asks in essence whether individuals who were anticipating a workshop had different concerns from those who had attended one the previous summer and were not anticipating another. Figure 6 illustrates the differing profiles, the solid line being the 1975 workshop participants and the dashed line indicating those who had attended the previous year's workshop. The former group's concerns were higher on Stages 0, 1, and 2 as anticipated of nonusers, and the latter group's concerns were higher on Stages 4, 5, and 6, again, expected of users.

(2) Is there a difference in SoC before and after the workshop for participants in the 1975 workshop?

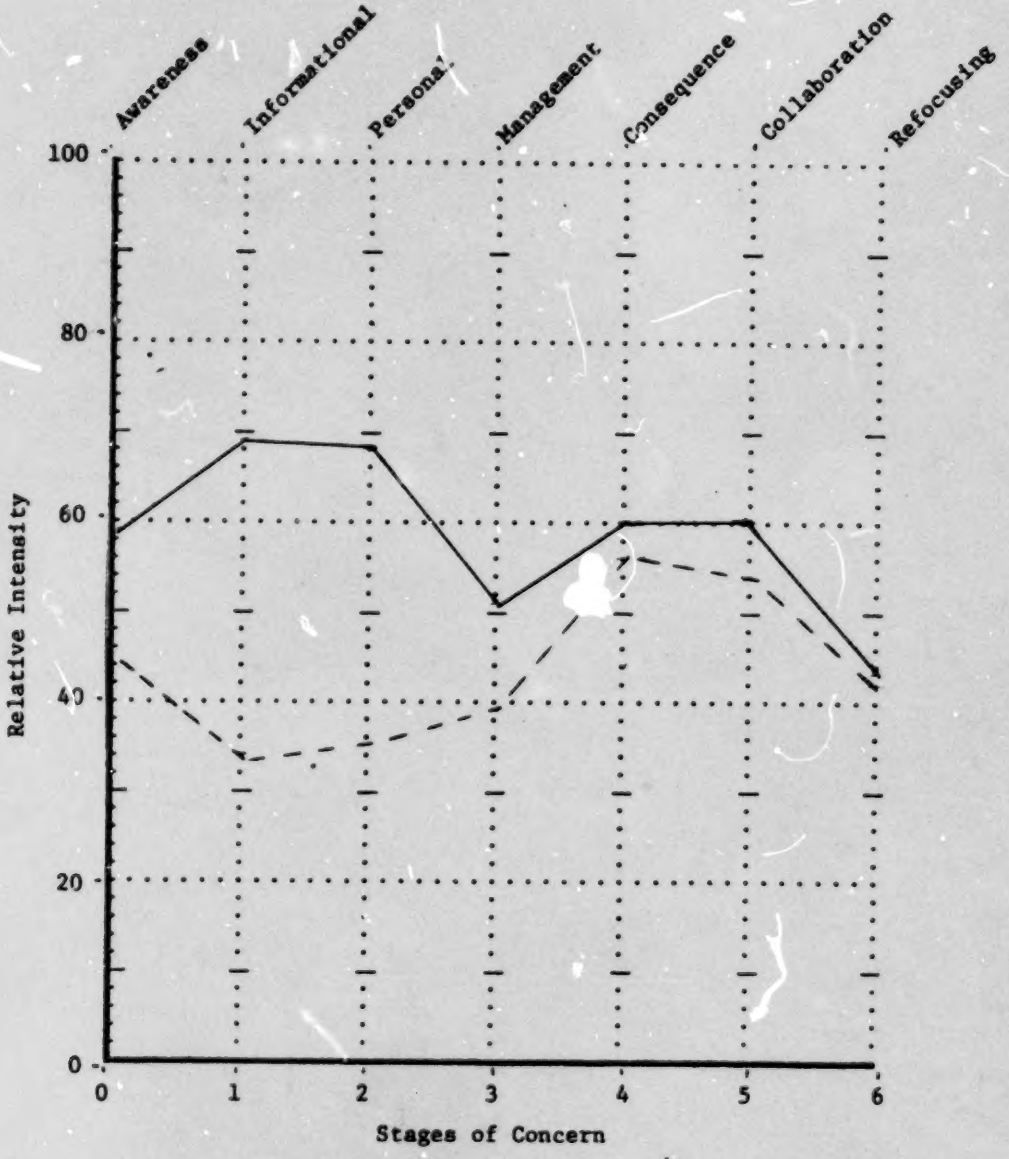
Figure 7 illustrates the change in SoC profile of the group that completed the 1975 workshop. The solid line, indicating the May data, illustrates the typical nonuser profile, high on Stages of Concern 0 through 2. The dashed line, indicating the September data, illustrates the lowered Stage 0, 1, and 2 concerns, and the raised Stage 4, 5, and 6 concerns.

(3) Is there a difference in SoC of users of SCIS and nonusers of SCIS before the 1975 workshop and after?

Figures 6 and 7 grouped users and nonusers in an effort to characterize and see changes in SoC of entire groups. Figures 8a and 8b separate SCIS

Figure 6

SoC Profiles of 1974 and 1975 Workshop Participants
Before the 1975 Workshop



– – – – = 1975 Workshop Participants

——— = 1975 Workshop Participants

Figure 7

SoC Profiles of 1975 Workshop Participants
Before and After the Workshop

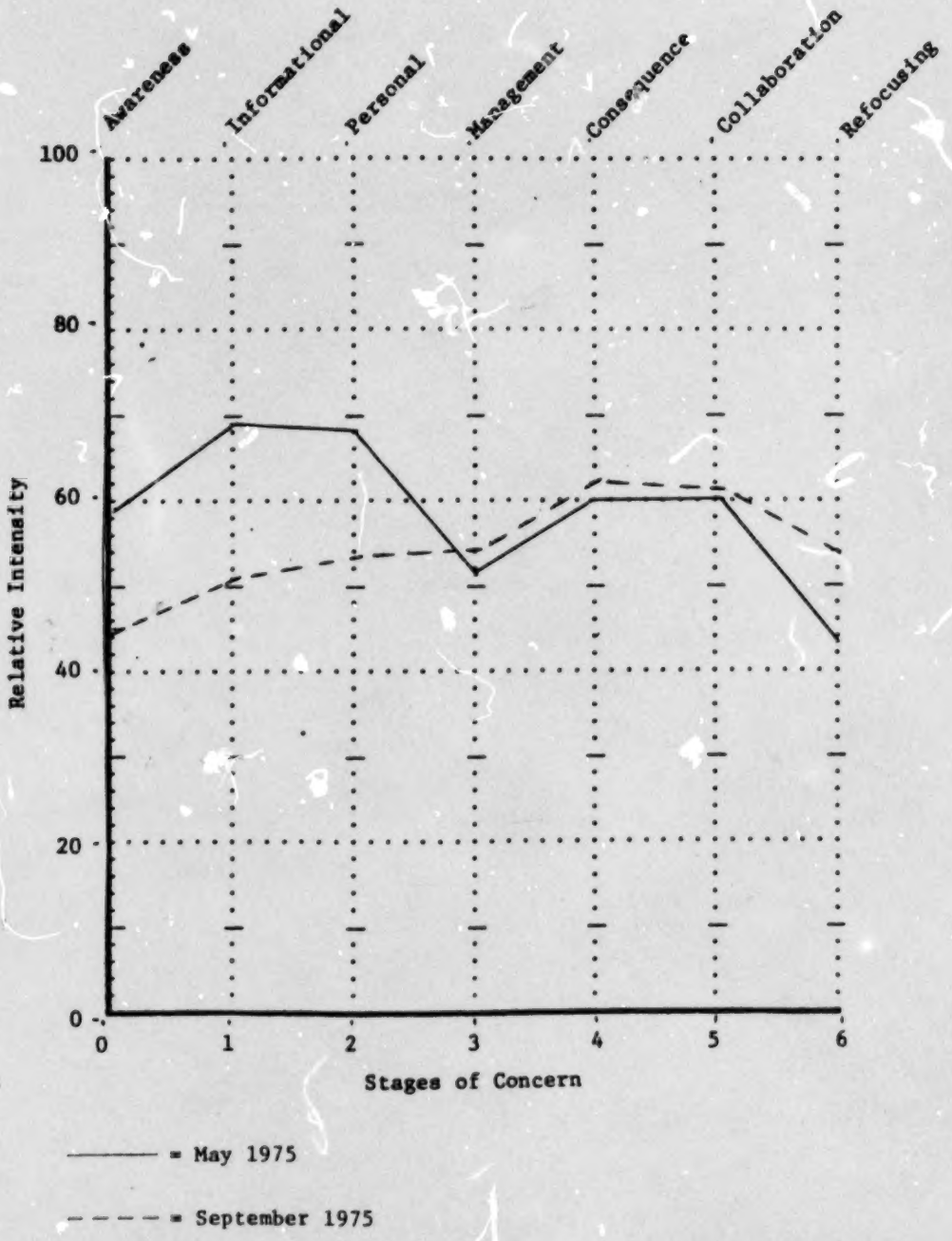


Figure 8a

SoC Profiles of SCIS Nonusers
(As Designated in July 1975) Before and After the 1975 Workshop (N = 10)

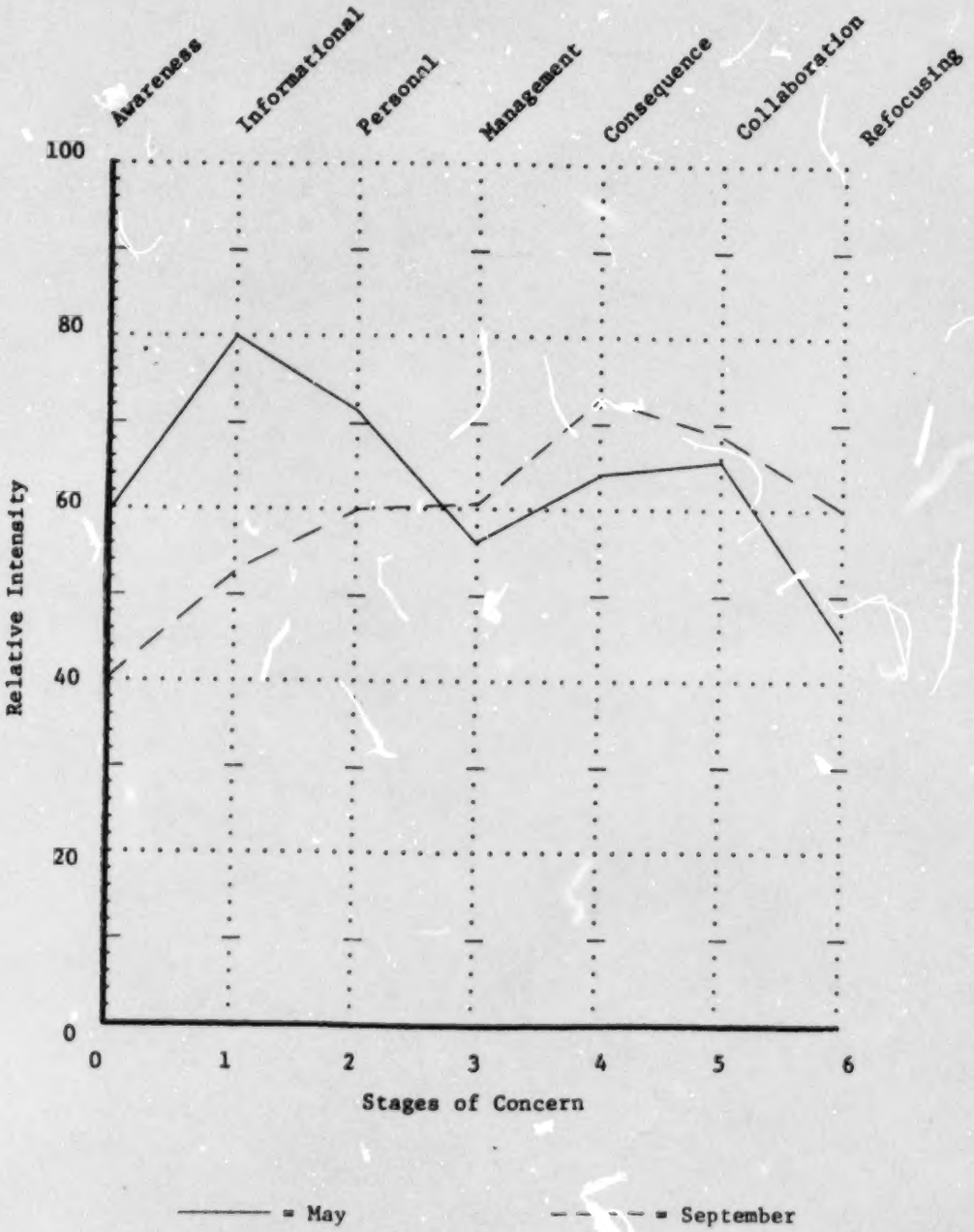
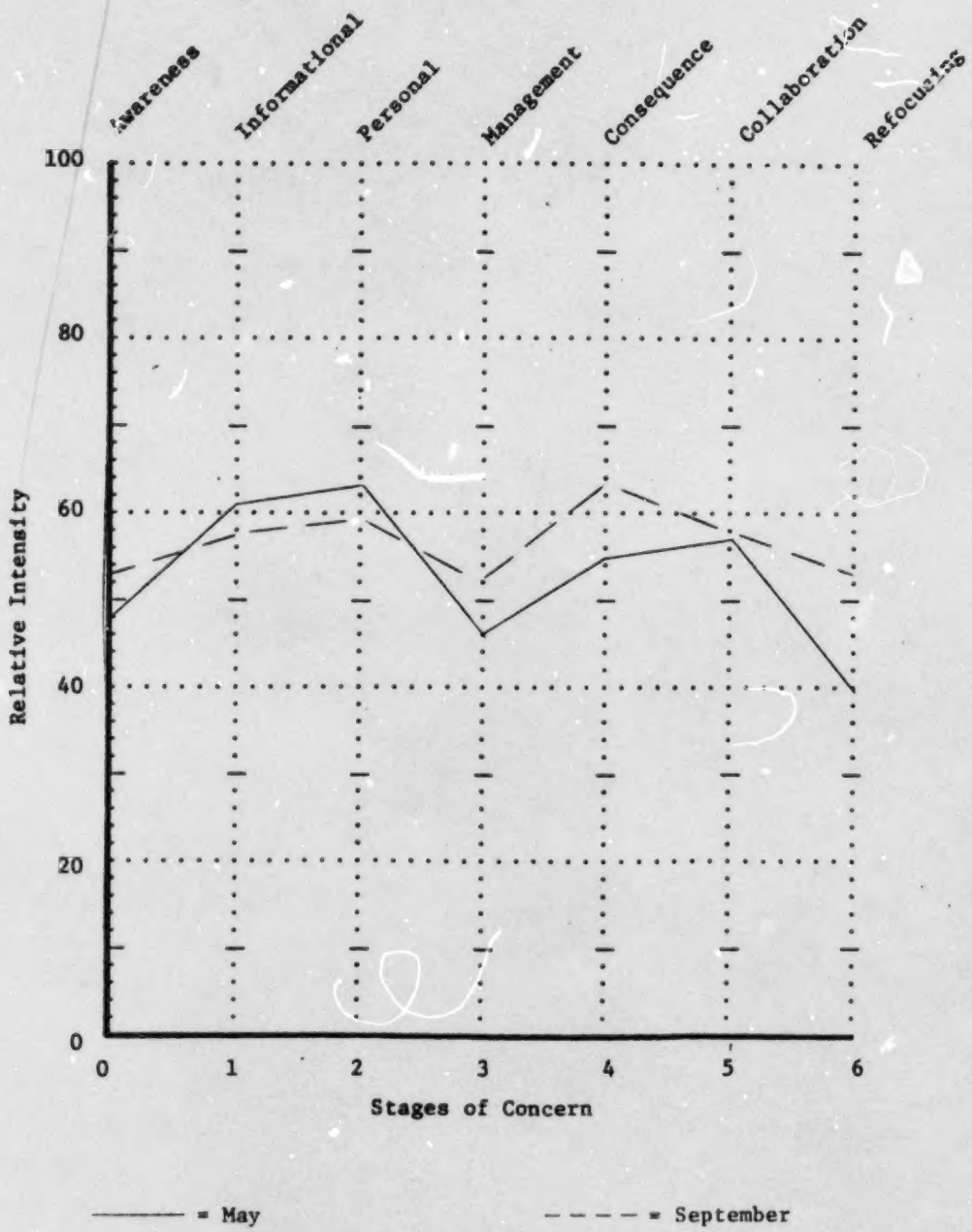


Figure 8b

SoC Profiles of SCIS Users
(As Designated in July 1975) Before and After the 1975 Workshop (N = 10)



nonusers and users to see if the workshop affected the concerns differently. The data presented here is that of the ten users (8a) and the ten nonusers (8b) who provided complete data for the study and attended the 1975 summer workshop. Note that the "user" and "nonuser" designations are based on data collected in July.

The profiles indicate a few clear distinctions. First, the nonusers have the typical nonuser (high on lower SoC, low on higher SoC) profile before the workshop, and after the workshop have the typical user profile (low on lower SoC, high on higher SoC) (Figure 8a). The users' profile does not show any strong peaking to begin with, but after the workshop there is a slight decrease in Stage 1 and 2 concerns and a heightening of Stage 3, 4, and 6 concerns (Figure 8b). Thus, the group profiles are different and both change in the expected ways.

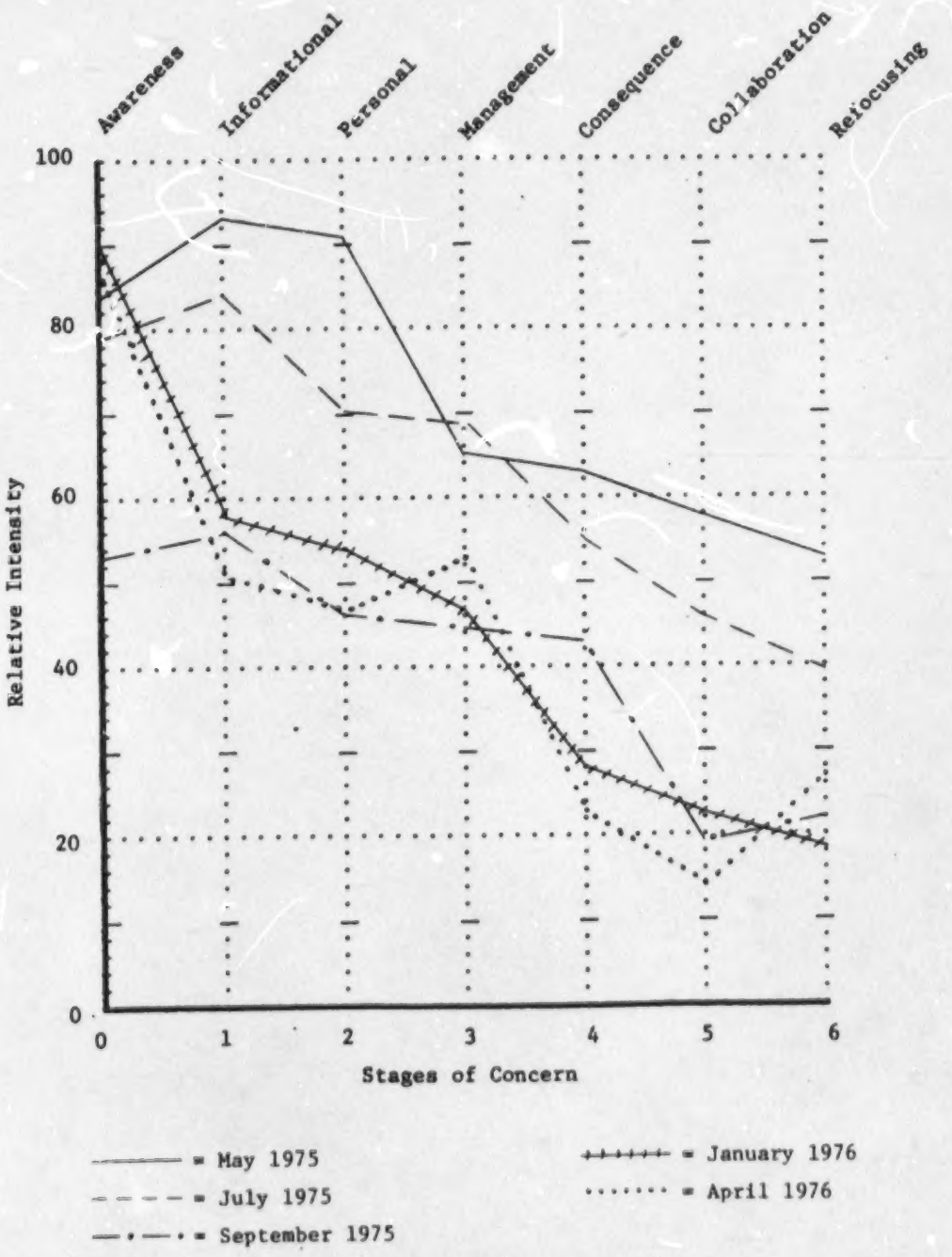
(4) What can be learned about individuals from the changes in their SoC profiles?

So far in this paper, only group data has been displayed and discussed. However, one strength of concerns research is that it focuses primarily on the individual and assumes that individual concerns may vary widely. Two individual SoC profiles are presented here to illustrate the differences that can exist between individuals and underline the importance of knowing the concerns of each.

Figure 9 illustrates the changing SoC profile of one teacher involved in the study (Newlove, unpublished memorandum). At every data collection period, Teacher A exhibited nonuser concerns, i.e., has relatively higher Stage 0, 1, and 2 concerns and lower Stage 3 through 6 concerns. What is most noticeable is the decrease in intensity of all concerns over time from May through the following April, with never a sign that Teacher A began to use SCIS. This is

Figure 9

SoC Profiles of Teacher A for Five Data Collection Periods



indeed what happened. She attended the workshop excited and fully expecting to teach SCIS the following fall. However, because she was on a team where another teacher taught all the science, those expectations never materialized. Teacher A's need to know more about SCIS gradually and significantly decreased without the accompanying heightening of concerns about actually operationalizing the program.

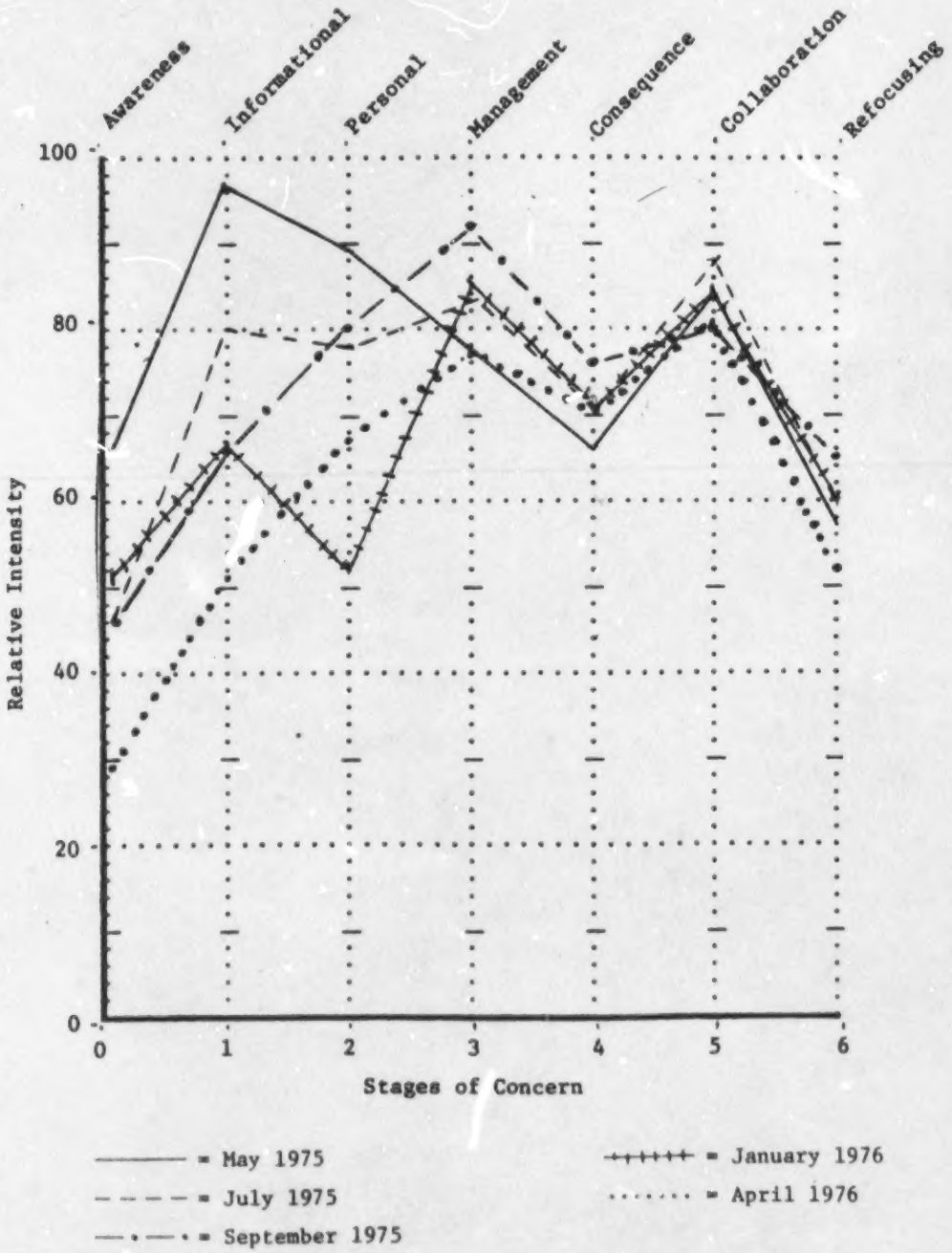
Figure 10 illustrates the changing SoC profile of another teacher. In May, Teacher B exhibited a typical nonuser profile with particularly high informational and personal concerns (SoC 1 and 2). These concerns began to decrease in intensity and by September, management concerns (SoC 3) predominated. This is to be expected if the innovation is in use for the first time. By April, these management concerns decreased somewhat, as had the intensity of most concerns, and Stage 5 concerns became relatively more significant. Teacher B's concerns over time illustrate the expected "wave motion" depicted in Figure 2.

Discussion and Implications

A major research question posed by the SCIS study was whether concerns of individuals involved in innovation adoption change in any predictable way, i.e., are Stages of Concern developmental? Although there are other ways that the data could have been presented in this report of findings, it appears that for all the analyses preformed, Stages of Concern for individuals in the sample followed a general developmental trend from being more intense at the lower Stages of Concern to becoming more intense at the higher Stages of Concern. It appears in general that among both users and initial nonusers, Stages of Concern 0, 1, and 2 decrease over time, and Stages of Concern 4, 5, and 6 increase over time.

Figure 10

SoC Profiles of Teacher B for Five Data Collection Periods



One finding that was not expected was that Management concerns (SoC 3) never predominated for any group. This has not been the case with other innovations studied, particularly in the team teaching study where management concerns predominated through many years of experience (Hall & Rutherford, 1976). It may be that the SCIS workshop provided so many important experiences for teachers that their management concerns were sufficiently resolved by the time teachers started using the curriculum. On the other hand, interviews with teachers in the SCIS study indicated that a significant number had not begun using the curriculum in September, and it could be that, although the workshop resolved informational and personal concerns (SoC 1 and 2), management concerns were not to be aroused until actual use began. By the time of the January questionnaire, these same teachers may have used the curriculum for three or four months and their management concerns may have been resolved.

Any time that data is aggregated, interpretations are subject to error. This is particularly the case in research that makes the assumption that individuals have their own concerns that may be very different one from the other at any given point in time. Therefore, it is important to consider individual as well as group SoC data, particularly when making inservice and training decisions. For example, input sessions planned to follow up the summer 1975 workshop should have been planned quite differently for the two teachers whose individual data was discussed and displayed.

Stage of Concern data is valuable in that it gives the "adoption agent" information about what teachers are most concerned about at any point in time with respect to a particular program, product, or idea. At this date, what the adoption agent does with the SoC data is determined by his or her judgment of appropriate actions, input, support, or what the R&D Center staff calls "interventions." Understanding interventions and studying what kinds are

appropriate given specific teacher concerns, is an important next step in Stages of Concern research. For the moment, it appears that the concept of concerns is meaningful to many practitioners and that the use of the SoC Questionnaire promises to increase the relevancy of staff development activities.

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